Streams & Watersheds of the Cuyahoga

CUYAHOGA AMERICAN HERITAGE RIVER

Brochure #2

Flowing Water is an Important Force in Shaping Our Land

Streams and Rivers are:

- **Complex** systems in which biological, physical and chemical processes interact;
- **Powerful** systems that erode and shape our landscape;
- **Aesthetically** pleasing and provide green space corridors that connect to existing parklands and local communities;
- **Ecologically** rich and provide habitat for diverse plant and animal species;
- **Economically** valuable by influencing: regional reputation & tourism, recreational activities, human health, wildlife populations and the viability of streamside communities.

Watersheds are Nature's Way of Managing Precipitation

Our region's network of streams and rivers all originate from watersheds. A watershed is an area of land that drains precipitation (rain & snowmelt) to a stream, river or lake. Watersheds are influenced by soil type, topography, geology, vegetation, groundwater, and land use. Watersheds manage precipitation by:

- Pooling water that evaporates,
- Soaking water into the soil,
- Gathering surface water into streams

Streams & Watersheds Work Together

Streams are dynamic systems that adjust to compensate for changes in their watersheds and have the capacity to:

- Moderate the *volume* and *energy* of water
- Transport and deposit sediment
- Create and sustain aquatic *habitat*, and
- *Assimilate*, or *process* a limited amount of pollutants and still achieve water quality standards.

The Cuyahoga River Basin drains 813 square miles and includes 1,220 stream miles spanning parts of 6 counties. For 12 thousand years the Cuyahoga has been shaping and sustaining our landscape.

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Our communities exist within watersheds. And like the relationship between streams and watersheds, communities must work together to achieve sustainable stream stewardship.

A System of Stream Elements Man

How Streams Work
Streams and rivers are highly organized, natural systems of physical and biological features that manage the volume and energy of the water, and provide important ecological habitats.

Wetlands

Wetlands store water and dissipate energy. Vegetation, root mats and sponge-like soils help trap, filter and slowly release water into streams and groundwater supplies. These natural systems help store excess water that would otherwise contribute to flooding and stream bank erosion.

Wetlands provide critical habitat (food, shelter and nursery) for a wide variety of plants, birds, amphibians, insects and fish.

Due to expanding urbanization, wetlands are increasingly scarce, valuable resources that need to be preserved in our region.

Headwater Streams

Headwater streams are the places where overland flow begins to gather into a defined bed and bank. These streams account for 80% of stream miles in Ohio and have important influence on stream quality.

Headwater streams provide habitat for small fish, amphibians, and aquatic insects. They provide essential transportation corridors and supply downstream rivers with cleansed water and beneficial nutrients.

Headwaters are valuable resources that are often overlooked and need protection.

Riparian Zones

Riparian Zones are heavily vegetated lands along streams that provide water absorption and energy dissipation. Leaves, soil and root zones absorb water and stabilize banks. Bank-side roots help to slow stream flow.

The vegetated corridors along streams provide for fish & wildlife migration; shade and cool water allowing more oxygen retention; and support and sustain habitats by providing nutrients and woody debris and cleaner runoff by filtering pollutants.

Natural riparian zones are essential to stream function and need to be preserved.

Floodplains

Floodplains are relatively flat areas along the banks that absorb the volume and velocity of floodwaters allowing for the slow release of water back into the stream. Occasional, out-of-bank events (or flooding) are natural.

Floodplains enhance biological productivity by supporting a high rate of plant growth. Floodplains provide excellent habitats for fish and wildlife by serving as breeding and feeding grounds.This helps to maintain biodiversity and the integrity of ecosystems.

Floodplains need to be kept undeveloped to allow for stormwater release and space for streams to meander.

age The Volume & Energy of Water

Pools

Pools are deep, slow moving stream sections that provide temporary water and energy storage. Pools generally form on the outside of channel curves and below changes in elevation.

Pools can also be found around undercut banks and wood debris, which provide excellent resting, refuge, and feeding habitat for fish. Anglers seek pools because they are great fishing spots.

Pools are suseptible to damage from excess sedimentation.

Riffles

Riffles are shallow, swift flowing rocky stream sections. Riffles reduce stream flow energy through friction as water travels over the bumpy streambed.

Riffles help add oxygen to streams as water tumbles over rocks. This is where most fish spawning and aquatic insect activity takes place.

Lack of erosion control and storm water management can clog the riffles with sediment; reducing their effectiveness.

Runs

Runs are fast, less turbulent flowing areas that efficiently move water to other energy absorbing stream features.

Runs effectively move nutrients and oxygen downstream and provide habitat and migration corridors for aquatic life.

Streams with well developed pool, riffle and run habitats generally have the healthiest aquatic communities.

Meanders

The S shaped channels that flow through flood plains are known as meanders. They extend the length of the stream allowing it to hold more water and increase its access to the adjacent floodplain. This helps store stormwater, reducing downstream flooding.

Meanders undercut banks and expose tree roots that provide pools and sheltered habitat for aquatic life.

Changes to stream flow resulting from increased urban run-off can drastically alter the meandering process. As urbanization increases streams must be allowed to have access to their flood plain.

This interrelated system of stream features has formed through a process of energy dissipation and reflects long-term geologic, climatic and vegetation patterns. Disruption of the stream system has unavoidable consequences and costs.

Watershed Stewardship Requires Planning & Action

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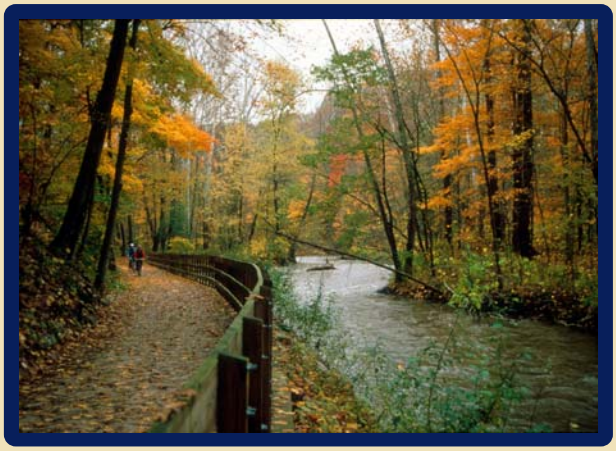
The Health of the Cuyahoga River Depends On the Quality of Land Use in the Watershed.

Gravity provides the force by which water and sediment are delivered to the Cuyahoga River, but the quantity and quality of the runoff depends on our land use in the watershed. The Cuyahoga River receives runoff from 83 local communities with varying land use patterns. Development often occurrs without fully understanding the consequences and cumulative affects on the surrounding streams and social environment. Poorly designed land use can cause an imbalance between a river and its watershed that can lead to:

- Increased risk of flooding & erosion to downstream communities,
- Increased costs for dredging & disposal in the navigation channel,
- Increased public health risks from poor water quality.



The West Creek Urban Wetlands Project constructed a one acre wetland in Parma that will enhance science education.

Watershed Planning & Action

Restoring and protecting the Cuyahoga River and Lake Erie must play a permanent role in our future. Multi-community cooperation has a history of benefiting our region. Our region's vitality, economy and quality of life are inextricably linked to the health of the Cuyahoga River, its tributaries and Lake Erie.

Benefits of Watershed Friendly Development

- **Saves money** by reducing the amount of land clearing and pavement needed when compared to conventional development;
- **Increases property values** by providing attractive community greenspace and recreational opportunities;
- **Maximizes the use of existing infrastructure** within communities;and
- **Sustains watershed systems** by reducing pollutant runoff and impacts on critical natural areas.

Value of Active Tributary-Based Watershed Groups

- Educates citizens on how to take better care of their watershed;
- Creates a sense of local ownership of their environment, thus ensuring long-term support for community involvement;
- Creates partnerships among local governments, citizens, groups, and institutions to participate in addressing local issues;
- Helps to focus community resources towards effective watershed stewardship; and
- Results in more locally relevant solutions that take into account each community's unique social, economic, and environmental conditions and values.

To learn more about supporting stream stewardship and developing watershed plans in your community, contact the Cuyahoga American Heritage River Partners.

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This brochure is part of a series being prepared by the Cuyahoga AHR Partners to help local officials and interested citizens understand the issues and benefits of local watershed stewardship. Each guide is designed to cover a single topic related to watersheds and stream sustainability. The complete series will comprise a Watershed Handbook for Cuyahoga watershed communities.

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